Small Business Innovation Research/Small Business Tech Transfer

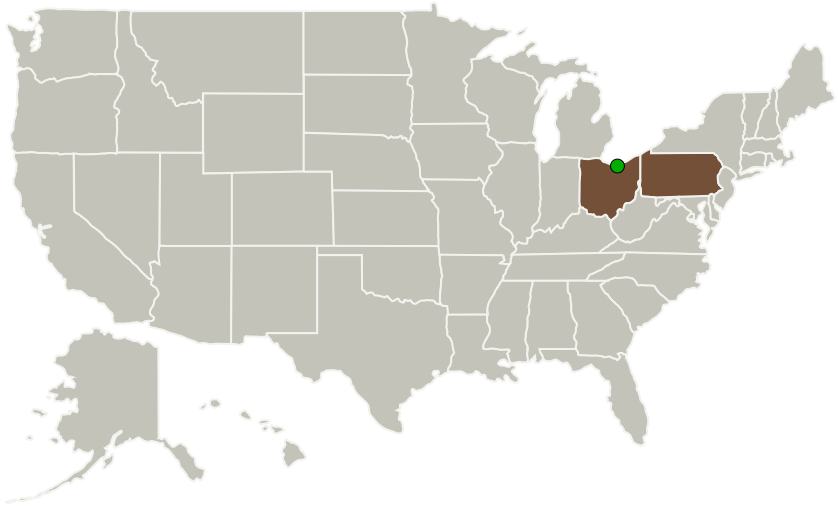
Extreme Environment Compatible Ceramic Enhanced PEBB Devices (EE-PEBB), Phase II

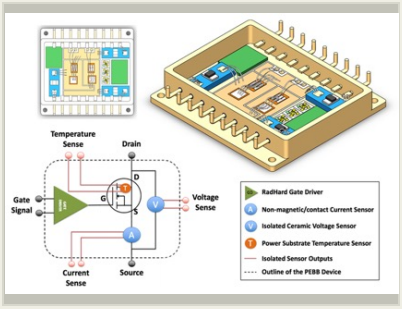
Completed Technology Project (2016 - 2018)

Project Introduction

A critical element in the NASA/NRC Technology Roadmap is to develop Power Electronic Building Block (PEBB) devices that can function in Extreme Environments. NASA?s stated aim is to use high power density/high efficiency PEBB devices to streamline design and introduce size, weight, cost and efficiency savings. The formidable challenge is to design such PEBB devices that use materials that can function in Extreme Environment conditions. The proposed high power density/high efficiency PEBB solution employs ceramics, striction materials and wide bandgap semiconductors as to meet these Extreme Environment operation challenges. This design eliminates transformer magnetics and opto-isolators (required for galvanic isolation) and eliminates external circuits and components as to provide lower complexity, enhanced performance, and much higher SWaP specifications than currently available. These ?smart? PEBBs incorporating new design and novel materials can now provide NASA design engineers with a whole new level of self-monitoring capabilities as to include voltage, current and temperature self-sensing at the device junction level. These will enable robust prognostics, power reconfiguration, and advanced control methods to be rapidly developed and tested.

Primary U.S. Work Locations and Key Partners





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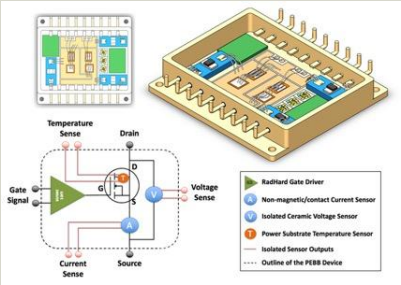
Organizations Performing Work	Role	Type	Location
QorTek Inc	Lead Organization	Industry Small Disadvantaged Business (SDB)	Williamsport, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Images



Briefing Chart Image
Extreme Environment Compatible Ceramic Enhanced PEBB Devices (EE-PEBB), Phase II
(https://techport.nasa.gov/image/126411)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
QorTek Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

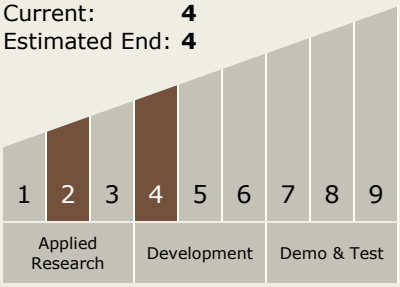
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Ross W Bird

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System